Networking your world

NT205B

5.7Mbps G.shdsl bis LAN Extender with 4 Ethernet

User's Manual

Http://www.netsys.com.tw

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Maximum signal rate derived form IEEE Standard specifications. Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead lower actual data throughput rate.

Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions before device use.

- **DO NOT** open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel can service the device. Please contact your vendor for further information.
- **Use ONLY** the dedicated power supply for your device. Connect the power cord or power adaptor to the right supply voltage (110V AC in North America or 230V AC in Europe).
- **DO NOT** use the device if the power supply is damaged as it might cause electrocution. If the power supply is damaged, remove it from the power outlet. DO NOT attempt to repair the power supply. Contact your local vendor to order a new power supply.
- **Place** connecting cables carefully so that no one will step on them or stumble over them. DO NOT allow anything to rest on the power cord and do NOT locate the product where anyone can work on the power cord.
- **DO NOT** install nor use your device during a thunderstorm. There may be a remote risk of electric shock from lightning.
- **DO NOT** expose your device to dampness, dust or corrosive liquids.
- **DO NOT** use this product near water, for example, in a wet basement or near a swimming pool.
- **Connect ONLY** suitable accessories to the device.
- **Make sure** to connect the cables to the correct ports.
- **DO NOT** obstruct the device ventilation slots, as insufficient airflow may harm your device.
- **DO NOT** store things on the device.
- **DO NOT** use the device outside, and make sure all the connections are indoors. There may be a remote risk of electric shock from lightning.
- **Be careful** when unplugging the power, because the transformer may be very hot.
- **Keep** the device and all its parts and accessories out of children's reach.
- **Clean** the device using a soft and dry cloth rather than liquid or atomizers. Power off the equipment before cleansing it.
- This product is **recyclable**. Dispose of it properly.

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Chapter 1. Description

1.1 Product Description

The NT205B, a SHDSL (Single-pair High-bit-rate Digital Subscriber Line) LAN Extender, provides a broadband transmission with bandwidth up to 5.696Mbps over a single pair of copper wires for LAN connection between two local area networks. NT205B provides a console port for users to configure the settings and to monitor the DSL connection status.

NT205B conforms to ITU-T G.991.2, the GSHDSL requirements. Each NT205B can be configured as either STU-C for the central side or STU-R for the remote side. A pair of NT205B offers a cost effective symmetrical broadband solution for bandwidth-hungry applications such as LAN-to-LAN connection, Internet, etc.

Features:

- ITU G.991.2 Annex A, Annex B and Annex F
- Symmetrical downstream and upstream data rates from 192Kbps to 5.696Mbps
- Auto-Negotiation for 10/100 BaseT
- Auto-MDIX for Auto Ethernet Tx/Rx Swap

1.2 Specification

G.SHDSL line

- Line Coding: 16 TC-PAM or 32 TC-PAM
- Line Rate: 192K bps ~ 5696 Kbps
- Standard: ITU-T G.991.2, Annex A, Annex B and Annex F selectable

LAN interface

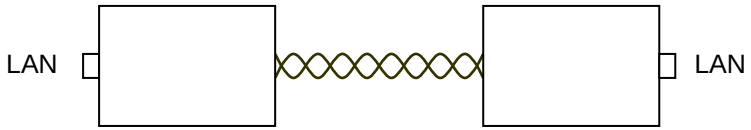
- Mac Address filtering bridge up to 2K Mac address learning
- Bridge: IEEE 802.1D transport, self-learning
- VLAN Tag based & Port Based
- Bandwidth Control for Ethernet Port

Physical interfaces

- 4 x RJ45 10/100Mbs Ethernet ports
- 1 x RJ-11 port for G.SHDSL connection
- One console port: DB-9 Female
- DC 5 V power input

1.3 Application

Following Figure shows a point to point application for user interface LAN



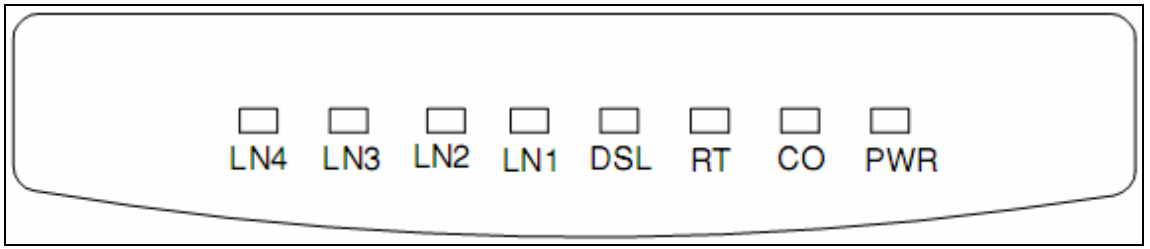
Ethernet Bridging

1.4 SHDSL system components

NT205B modem (CO) or NT205B modem (RT) in a working pair.

1.5 Front Panel LEDs Indicators

There are eight LED indicators on the front panel of NT205B. They show the statuses of the device.

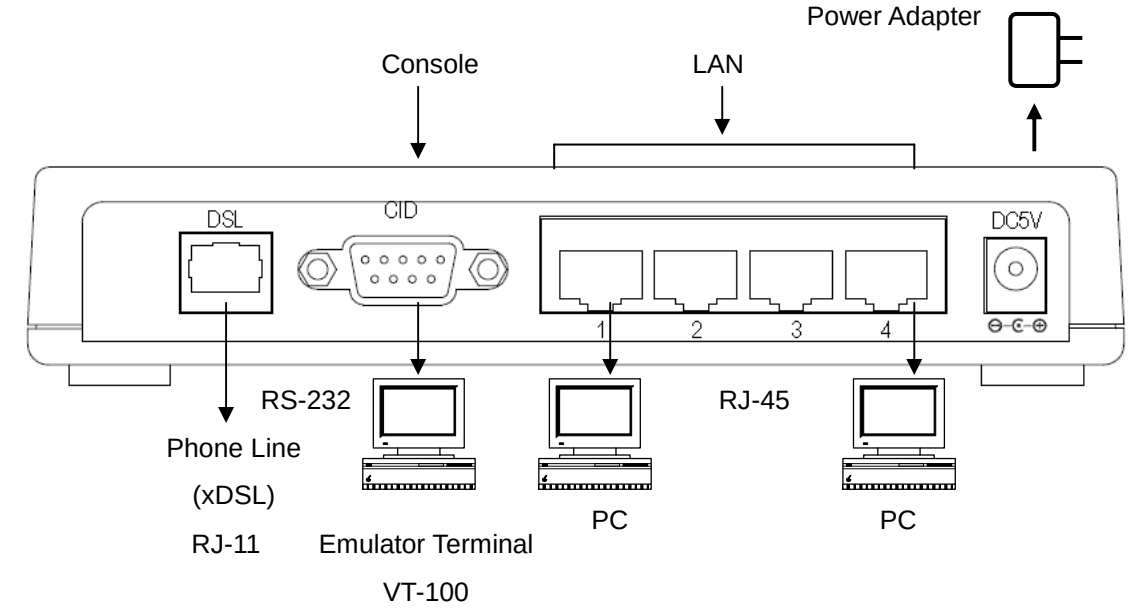


The functions of LED indicators are described in the following table:

LED	Color	Status	Meaning
PWR	Orange	Steady Off	The device is on. The device is off.
CO	Orange	Steady	The device is configured to CO mode
RT	Orange	Steady	The device is configured to RT mode
DSL	Orange	Steady Blinking Off	The device is Sync Status. The link is synchronizing - this may take several minutes. The device is unplugged or disconnected.
LN1	Orange	Steady	Link 1 - The LAN connection is successfully established.
LN2	Orange	Steady	Link 2 - The LAN connection is successfully established.
LN3	Orange	Steady	Link 3 - The LAN connection is successfully established.
LN4	Orange	Steady	Link 4 - The LAN connection is successfully established.

1.6 Rear Panel Connectors

The rear panel connectors connecting the device to the LAN and xDSL network are illustrated as below.



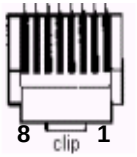
Rear Panel and Installation

LAN Interface characteristic

LAN Interface (RJ-45 port) located in NT205B's rear panel meets to IEEE 802.3 or IEEE 802.3u request and supports 10/100 Base-T auto test and half/all touble works model operation, bridge can provide up to 128 MAC address and MAC address filtration function, meets IEEE 802.1d protocol requirement.

RJ-45 wire

Figures separable shows as following :



RJ-45 pin out

Table1.14: 10/100 Base-T pin out

Pin NO.	Function	Data Direction	Designation
1	TX Transmitting Data	Toward the LAN network	TX+
2	TX Transmitting Data	Toward the LAN network	TX-
3	RX Receiving Data	Toward the LAN Equipment	RX+
6	RX Receiving Data	Toward the LAN Equipment	RX-

Chapter 2. Packaging

2.1 Checking Package Contents

NT205B Desktop is shipped with the following contents:

- One 110/220V power adaptor
- One NT205B User Manual

2.2 Prepare for Installation

Connecting the NT205B

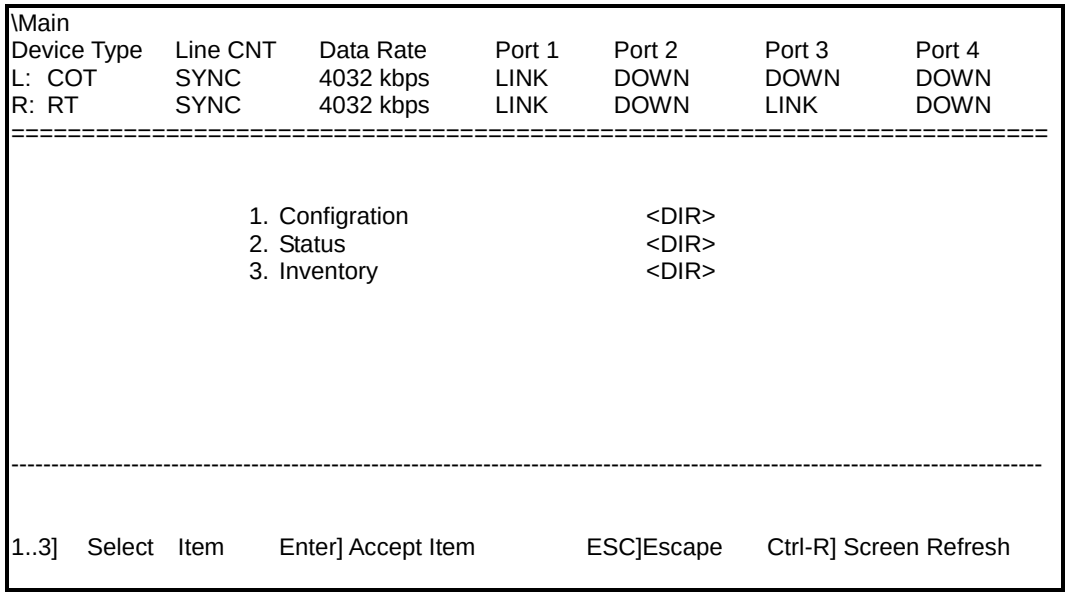
If configured from the Craft port, your are encouraged to use the virtual terminal emulator from Window / Microsoft and set the COM Port of PC to the following communication parameters:

- DTE speed 38.4Kbps
- 8 Data Bit
- Non – Parity Bit
- One Stop Bit
- No Flow Control
- Selection of "VT100" for Terminal Configuration

Chapter 3. Log On

To access the VT-100 console screen, check that the CID port speed matches the terminal emulation program currently being used. The default value for the CID port is 38.4k bps, 8 data bit, No Parity, 1 stop bit. The VT-100 console uses a blinking cursor to select various menus, sub menus and fields within those menus.

To pop up the console, press the " Enter " key several times to display the Log On Screen illustrated in the following screen.


\Main
Device Type Line CNT Data Rate Port 1 Port 2 Port 3 Port 4
L: COT SYNC 4032 kbps LINK DOWN DOWN DOWN
R: RT SYNC 4032 kbps LINK DOWN LINK DOWN
1. Configration <DIR>
2. Status <DIR>
3. Inventory <DIR>
1..3] Select Item Enter] Accept Item ESC]Escape Ctrl-R] Screen Refresh

Main Screen

Cursor Operation

To select a specific field or navigate the console screen, refer to the table below for further details.

Keyboard Command	Description
Tab	Tabs to previous item.
Space	Refreshes the entire screen.
Esc	Escapes to previous page
1 …N]	Fields enclosed in brackets [ ] offer a list of selections.
Enter	Validates the fields selected..

3.1 Menu Tree

Viewing from Main Menu, the second layer " 1. Configuration, 2.Status and 3. Inventory " and all its tributary parameters are shown in Figure 3.1.

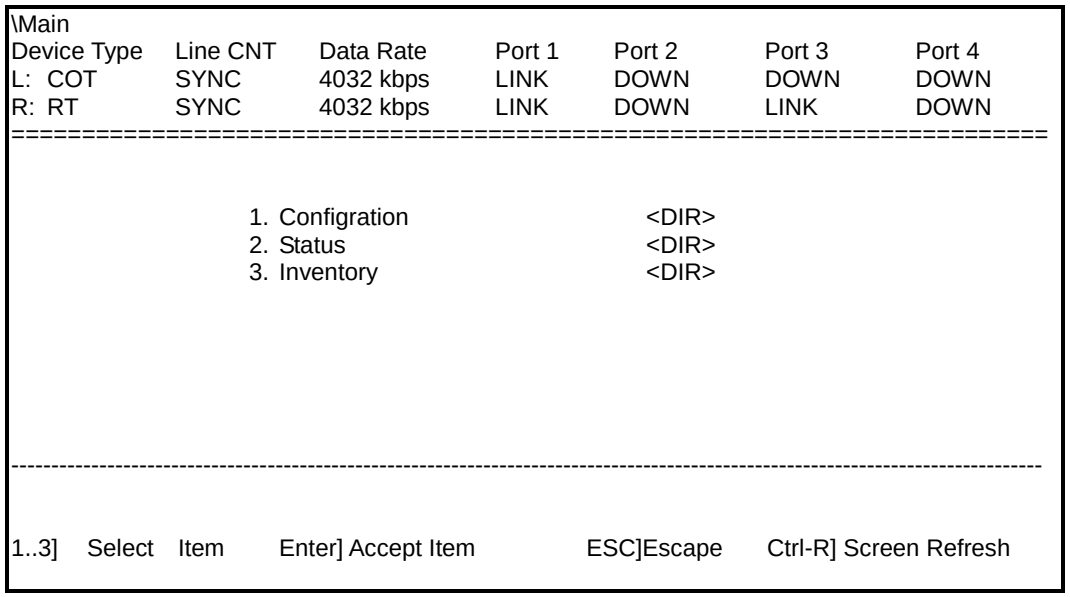
Figure 3.1: Menu Tree

Main Menu												
	>>	**1. Configuration**										
			>>	**1. Device Type**			COT; RT					
			>>	**2. Annex**			Annex A; Annex B; Annex F					
			>>	**3. DSL Rate**			3~89 (AnnexF) 3~36 (Annex A, B)					
			>>	**4. LAN Port**								
				>>	**1. Speed**		10M; 100M					
				>>	**2. Auto Negotiation**		Disable; Enable					
				>>	**3. Duplex**		Half; Full					
				>>	**4. Flow control**		Eable; Disable					
			>>	**5. VLAN setting**								
				>> 1. VLAN Mode			Unaware; Aware					
				>> 2. P-P Segmented Channel			Disable; Enable					
				>> 3. Ingress VID Range Start			0 (0 ~ 4096)					
				>> 4. Ingress VID Range Lenght			0 (0 ~ 16)					
				>> 5. Port 1 Bandwidth Value			1~ 89 , N*64Kbps					
				>> 6. Port 2 Bandwidth Value			1~ 89 , N*64Kbps					
				>> 7. Port 3 Bandwidth Value			1~ 89 , N*64Kbps					

			>> 8. Port 4 Bandwidth Value	1~ 89 , N*64Kbps					
		>>	**6. Factory Default**						
		>>	**7. Save**						
	>>	**2. Status**							
		>>	**1. Device Type**	COT; RT					
		>>	**2. Annex**	Annex A; Annex B; Annex F					
		>>	**3. DSL Rate**	64~5696 kbps					
		>>	**4. S/N**	(0~20dB)					
		>>	**5. DSL Status**	Idel; SYN; Handshaking;Trainning					
	>>	**3. Inventory**							
		>>	**1. H/W version**						
		>>	**2. S/W version**						

3.2 Main Menu

The Main Menu Screen, illustrated below,

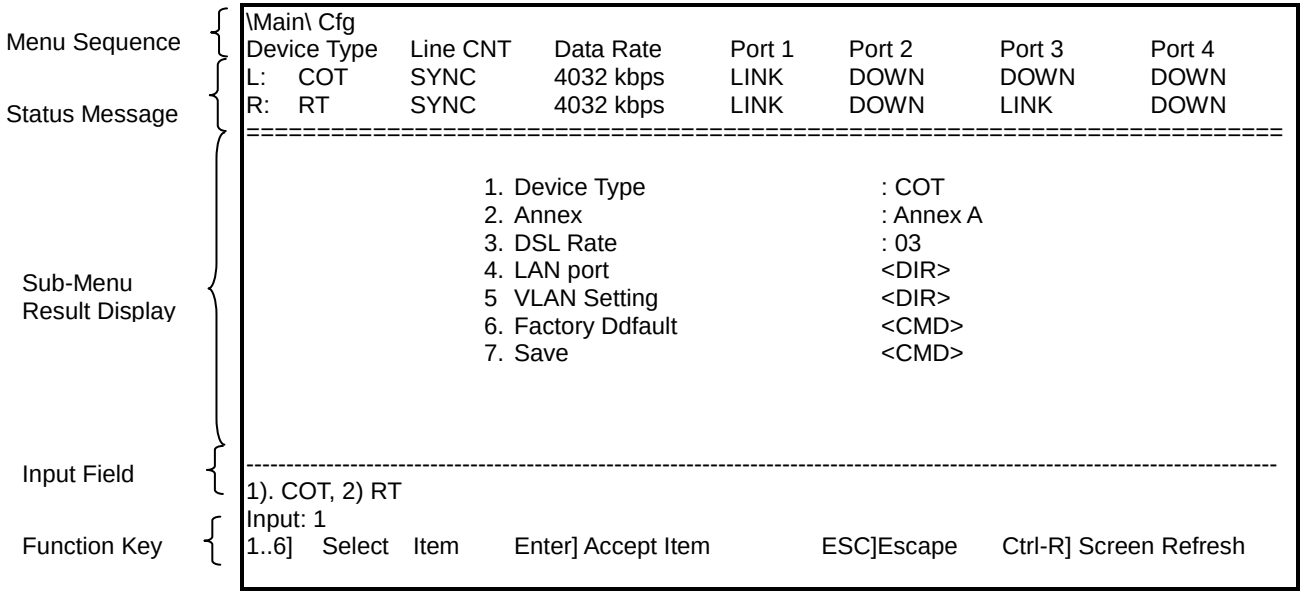

\Main
Device Type Line CNT Data Rate Port 1 Port 2 Port 3 Port 4
L: COT SYNC 4032 kbps LINK DOWN DOWN DOWN
R: RT SYNC 4032 kbps LINK DOWN LINK DOWN
1. Configration <DIR>
2. Status <DIR>
3. Inventory <DIR>
1..3] Select Item Enter] Accept Item ESC]Escape Ctrl-R] Screen Refresh

3.3 Console Screen Convention

The Console Screen Convention contains five user operating areas.

Menu Sequence:	The one-line top most area that shows sequence for bringing the menu to the current hierarchy.
Status/ Alarm message:	This is the two-line area above the double dotted line that provides network and user interface status and alarm message.
Sub-Menu or Result	This is the area above the single dotted line that

Display:	provides content of sub-menu or display of performance data and testing result.
Input field:	The area beneath the dotted line that shows options specific to menu or sub-menu items and allows user to enter value desired.
Function Keys:	The area right beneath the input field that lists the function keys specific to the operation of the menu currently displayed.


Menu Sequence
Status Message
Sub-Menu Result Display
Input Field
Function Key
\Main\ Cfg
Device Type Line CNT Data Rate Port 1 Port 2 Port 3 Port 4
L: COT SYNC 4032 kbps LINK DOWN DOWN DOWN
R: RT SYNC 4032 kbps LINK DOWN LINK DOWN
1. Device Type : COT
2. Annex : Annex A
3. DSL Rate : 03
4. LAN port <DIR>
5 VLAN Setting <DIR>
6. Factory Ddfault <CMD>
7. Save <CMD>
1). COT, 2) RT
Input: 1
1..6] Select Item Enter] Accept Item ESC]Escape Ctrl-R] Screen Refresh

Chapter 4. Configuration

This chapter provides instructions on how to access and configure your NT205B, displaying configuration options, restoring to factory default and saving the configuration.

In other words, the provisioning parameters for each SHDSL unit could also only be provided through the CID and NT205B Desktop functioning as STU-C. or as STU-R. In case of STU-R is connected to STU-C successfully then the DSL rate of STU-R will be changed as same as STU-Cs automatically. Please pay attention to the following notice.

1. Regional DSL modes - Annex A/B/F of STU-C and STU-R shall be set as the same. Otherwise the DSL can not get sync.
2. Given the same speed under 2304kbps, the transmission distance working in Annex A (or Annex B) is around 300 meters longer than working in Annex F at AWG26 wire. This is the testing result in a specific environment, for your reference only. User shall carefully set the regional mode for optimizing DSL reach or speed.

The first Item on the Main Menu Screen is " Configuration " option. The Configuration Screen below allows you to view, set or make changes to certain specific parameters about the unit in service.

The following Screen allows you to view and change the parameters of NT205B.

```
\Main\ Cfg
Device Type   Line CNT    Data Rate     Port 1    Port 2    Port 3    Port 4
L:  COT       SYNC        4032 kbps     LINK      DOWN      DOWN      DOWN
R:  RT        SYNC        4032 kbps     LINK      DOWN      DOWN      DOWN
================================================================================

                        1. Device Type                  : COT
                        2. Annex                        : Annex A
                        3. DSL Rate                     : 03
                        4. LAN port                     <DIR>
                        5  VLAN Setting                 <DIR>
                        6. Factory Ddfault              <CMD>
                        7. Save                         <CMD>


--------------------------------------------------------------------------------------------------------------------------------
1). COT, 2) RT
Input: 1
1..6]   Select   Item      Enter] Accept Item          ESC]Escape     Ctrl-R] Screen Refresh
```

Table 5.1Configure Parameters Screen Content

Item	**Description**
1. Device Type	Specifies whether the unit is configured as COT, or RT. Entry: COT; **RT**
2. Annex	Sets the transmission mode for SHDSL. Entry: **Annex A;** Annex B; Annex F
3. DSL Rate	Specifies data rate for DSL. Data rate could be configured in multiple of 64k. For Annex A or B ,N= 3 ~ 36, For Annex F, N=3~89.
4. LAN Port	Configure LAN Port
5. VLAN Setting	Configure the VLAN and Bandwidth control of 4 LAN port
6. Factory Default	Sets SHDTU03B-ET100BS to factory default
7. Save	Save the parameters to SHDTU03B-ET100BS

4.1 Configure Device Type

To configure the Device Type , apply the menu selection sequence: **Local >> Configure**. Move cursor to **1. Device Type** and specify whether the unit is configured as **COT,** or **RT**.

4.2 Configure Annex Mode

To configure the Annex Mode , apply the menu selection sequence: Local >> Configure. Move cursor to **2. Annex** and specify whether the DSL is configured as **Annex A, Annex B** or **Annex F.**

4.3 Configure DSL Rate

To configure the DSL Rate , apply the menu selection sequence: **Local >> Configure**. Move cursor to **3. DSL Rate** and Specifies data rate for DSL. Data rate could be configured in multiple of 64k. For Annex A or B, N= **3 ~ 36**, For Annex F, N=**3~89**.

4.4 Configure LAN Interface

To access LAN Port, apply the menu selection sequence: **Local >> Configure >> LAN port >>** as shown below.

```
\Main\ Cfg\LAN Port
Device Type   Line CNT    Data Rate     Port 1   Port 2   Port 3   Port 4
C:     COT    SYNC        4032 kbps     LINK     DOWN     DOWN     DOWN
R:     RT     SYNC        4032 kbps     LINK     DOWN     DOWN     DOWN
================================================================================

                        1. Auto Negotiation          : Disable
                        2. Speed                     : 100M
                        3. Duplex                    : Full
                        4. Flow control              : Enable




--------------------------------------------------------------------------------------------------------------------------------
1). Disable, 2) Enable
Input: 1
1..4]   Select   Item      Enter] Accept Item          ESC]Escape     Ctrl-R] Screen Refresh
```

The Ethernet interface parameters, described now, are provided in the following table.

Table 5.2: LAN Port Screen Content	
Item	**Description**
1. Auto Negotitation	Specifies whether the Ethernet interface is being operating in auto-detecting or Manually mode. Entry: Disable; Enable
2. Mode	Specifies the operating speed of LAN port Entry: 10M; 100M
3. Duplex	Specifies whether the Ethernet interface is being operating in Half or Full duplex mode. Entry: **Half**; Full
4. 802.3 flow control	Specifies whether the flow control is enabled or not. Entry: **Enable**; Disable

4.5 VLAN setting

>>	**5. VLAN setting**	
	>> 1. VLAN Mode	Unaware ; Aware
	>> 2. P-P Segmented Channel	Disable ; Enable
	>> 3. Ingress VID Range Start	0 (0 ~ 4096)
	>> 4. Ingress VID Range Lenght	0

	>> 5. Port 1 Bandwidth Value	1~ 89 , N*64Kbps
	>> 6. Port 2 Bandwidth Value	1~ 89 , N*64Kbps
	>> 7. Port 3 Bandwidth Value	1~ 89 , N*64Kbps
	>> 8. Port 4 Bandwidth Value	1~ 89 , N*64Kbps

Default configuration setup is VLAN unaware, customers can enable the VLAN by select the VLAN mode as "Aware".
There are two kind of VLAN implementation, one is the P-P Segmented Channel and the other is Tag based Vlan. These two implementation of VLAN can NOT work together. User should configure one option at one time.
For P-P segmented Channel implement, there is a typical application:

The LAN ports P1 … P4 at two locations are working like P1 --- P1, P2 --- P2 … 4 separated Ethernet lines.
Customer can set the LAN Port1~4 Bandwidth when the P-P Segmented Channel mode is selected. The priority for the bandwidth control between the 4 LAN port is :
The higher bandwidth value, the higher priority.

1) If the total bandwidth of the 4 port is less than the DSL connected rate, then bandwidth of every Port will be guaranteed.

2) When the total bandwidth of the 4 port is larger than the DSL connected rate, then the port with higher bandwidth setting will be satisfied firstly.

For the VLAN tage mode, the customer can assign the VID range which are allowed to pass and the VID which are not in this range will be discarded. For example, the ingrass VID Start = 3, and ingrass VID length is 10, then Ethernet packets with the VID between 3 and 12 will be allowed to pass, and the others will be discarded.

4.6 Factory Default setting

Default configuration setup is provided. To default the setting, follow the steps described below.
The " Local\Cfg." screen appears when the Local\Configuration menu sequence is entered. Position the cursor at option 5 " Factory Default " of Configuration menu and press " Enter " to restore setting to factory default. After setting default value, the system prompts you for a " Set default succeed ! Press any key to continue.." message displayed in reverse video.

4.7 Save configuration

Regardless of STU-C or STU-R, NT205B is provided with 2M byte non-volatile flash memory which stores all provisioning parameters of the unit.
When change are made to the selection option through the Configuration\Save sequence, the changes must be saved to take effect.

Chapter 5. Performance Monitoring

This chapter provides information on the display the status of NT205B that include the data rate of DSL, current signal-to-noise ration (SNR), the status of DSL and displaying the total number of received/transmitted Packets for each LAN port, follow the menu entering sequence: **Local >>> Statue**

```
\Main\ Status
Device Type   Line CNT   Data Rate      Port 1   Port 2   Port 3   Port 4
C:     COT    SYNC       4032 kbps      LINK     DOWN     DOWN     DOWN
R:     RT     SYNC       4032 kbps      LINK     DOWN     DOWN     DOWN
================================================================================

                    1. Device Type              : COT
                    2. Annex                    : Annex A
                    3. DSL Rate                 : 4032Kbps
                    4. S/N                      : 30
                    5. DSL status               : Synch
                    6. LAN 1 Rx/Tx packet       : 0          : 0
                    7  LAN 2 Rx/Tx packet       : 0          : 0
                    8  LAN 3 Rx/Tx packet       : 0          : 0
                    9  LAN 4 Rx/Tx packet       : 0          : 0

--------------------------------------------------------------------------------------------------------------------------

1..5]  Select  Item     Enter] Accept Item          ESC]Escape    Ctrl-R] Screen Refresh
```

Table 6.1: Display Status Screen Content	
Item	**Description**
1. Device Type	Displays the Device Type which you set SHDTU03B-ET100BS
2. Annex	Displays the Annex mode which you set SHDTU03B-ET100BS
3. DSL Rate	Displays the DSL Rate.
4. S/N	Displays the current signal-to-noise ration (SNR)
5. DSL Status	Display the current DSL Status.
6. LAN 1 Rx/Tx packet	Displays the total number of received/transmitted Packets through the LAN port 1
7. LAN 2 Rx/Tx packet	Displays the total number of received/transmitted Packets through the LAN port 2
8. LAN 3 Rx/Tx packet	Displays the total number of received/transmitted Packets through the LAN port 3
9. LAN 4 Rx/Tx packet	Displays the total number of received/transmitted Packets through the LAN port 4

Chapter 6. Inventory

This chapter provides identity information for the unit's services and revision state as illustrated in the figure below. To access this maintenance service, select " 3. Inventory " of main menu and hit " Enter " key to take effect.

```
\Main\ Inventory
Device Type    Line CNT   Data Rate  Port 1    Port 2      Port 3      Port 4
C:     COT     SYNC       4032 kbps  LINK      DOWN        DOWN        DOWN
R:     RT      SYNC       4032 kbps  LINK      DOWN        DOWN        DOWN
=============================================================

                    1 H/W version              : 1.3
                    .
                    2 S/W version              : 1.4
                    .
                    3 DSL version              : 06.00.02
                    .


1..3] Select   Item Enter] Accept Item    ESC]Escape   Ctrl-R] Screen Refresh
```

	Item	Description
1	S/W Version	: Displays the software version currently used for
2	H/W Version	: Displays the hardware version of circuitry.
3	DSL Vserion	: Displays the DSL version of circuitry.

Appendix A: Compliance and Safety Information

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a computing device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. The equipment and the receiver should be connected to outlets on separate circuits.
4. Consult the dealer or an experienced radio/television technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If this telephone equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the

proper functioning of your equipment. If they do, you will be notified in advance in order for you to make necessary modifications to maintain uninterrupted service.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Important Safety Instructions

- **Caution:** The direct plug-in wall transformer serves as the main product for disconnecting. The socket outlet shall be installed near the product and be readily accessible.
- **Caution:** Use only the power supply included with this product. In the event the power supply is lost or damaged:In the United States, use only with CSA certified or UL listed Class 2 power supply, rated **5Vdc**.
  IN Europe, use only with CE certified power supply, rated **5Vdc**.
- **Do not** use this equipment near water, for example in a wet basement.
- **Avoid** using a telephone during an electrical storm. There may be a remote risk of electrical shock from lightning.
- **Do not** use the telephone to report a gas leak in the vicinity of the leaking area.
- If you experience trouble with this unit, please contact customer service of your dealer immediately.
- **DO NOT DISASSEMBLE THIS EQUIPMENT**. It does not contain any user serviceable components.

FCC Warning

This equipment has been tested to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment can generate, use, and radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at owner's expense.

CE Mark Warning

This is a class B product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

WEEE Warning

To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.